Introduction to Nettion

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Outline

- Nettion
  - NETwork TesTIng and Operational eNvironment
- Why do we need Nettion?
- What is Nettion?
- How is Nettion used?

Why Nettion?

- A Brief History (sort of)
- Two node test
  - Simple enough
  - Sort of....

Individually Control Applications

MGEN

Olsr

JMap

MPMGR

Egret

GPSLogger

Dazle

TcpDump

TRPR

Rate

IVOX

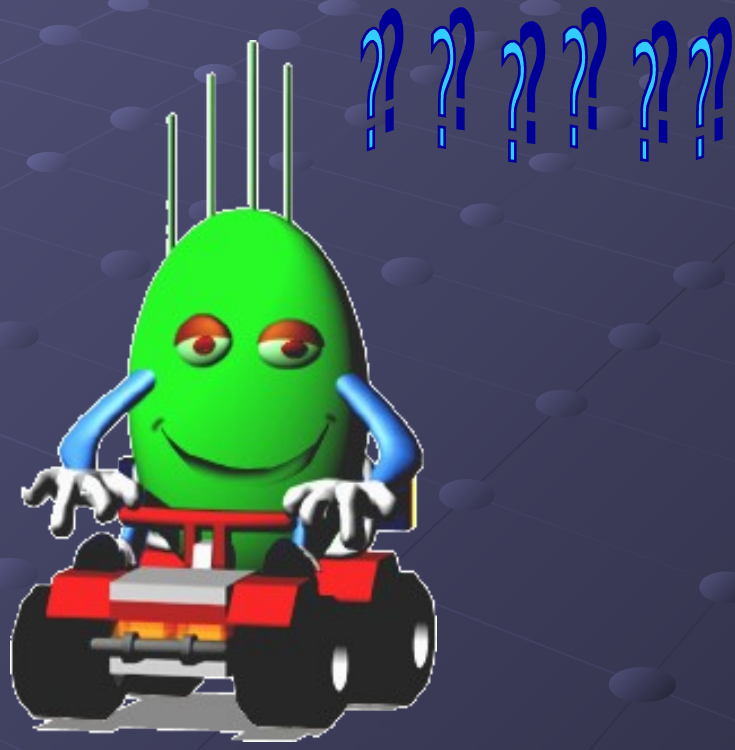
GnuPlot

Rat

Not Just Two Nodes...

Problems

- Too much typing!
- Hard to remember syntax for all applications!
- Synchronization of test start?
- Installation of apps?
- Collecting data?



What is Nettion?

- Nettion is a suite of applications for testing a network
  - Particularly useful for mobile networks
- Technically, it's the "Nettion Software Suite"
  - Think "Office"
- Includes glue between the applications to help them get along
- Includes a set of usage "best practices"

It’s In There

- What’s in the suite?
  - MGEN
  - Egret
  - JMap
  - Dazle

It’s In There Too

- What’s in the glue?
  - Simple control GUI
  - OS Installation tools
  - Nettion Deployment tools
  - Compact Flash Integration

MGEN

- Multicast GENerator
- Traffic Generator
  - Puts the 1 and 0s on the network
- Developed by Brian Adamson at NRL
- Well established and tested
- Scriptable
- Integrates with GPS and other external programs
- Excellent at multicast and UDP
- TCP and other protocols planned for the future

Egret

- Experiment GeneRator and ExporT
- MGEN Script file generation tool
- Developed by Kenneth Flynn
- Allows development of MGEN scripts at a high level
  - Think in terms of flows from sources to destinations
  - Gets the syntax right so you don’t have to
- Limited import of COMTEST scenarios

Egret

File Machines Endpoints Patterns Scenarios Flows Import Export Help

Machines:

Name	Address
Node_01	132.250.101.2
Node_02	132.250.102.2
Node_03	132.250.103.2
Node_04	132.250.104.2
Node_05	132.250.105.2
Node_06	132.250.106.2
Node_07	132.250.107.2
Node_08	132.250.108.2
Node_09	132.250.109.2
Node_10	132.250.110.2
Node_11	132.250.111.2
Node_12	132.250.112.2
Node_13	132.250.113.2
Node_14	132.250.114.2
Node_15	132.250.[illegible].2
Node_16	132.250.[illegible].2
Node_17	132.250.[illegible].2
Node_18	132.250.[illegible].2
Node_19	132.250.[illegible].2
Xcom	132.250.[illegible].2

Machines

Endpoint Sets:

ARRSdismount_controller
All Nodes
BCN_BN_CMD_FSO_FCDR
BCN_S3_02_Effects_Fires_FC2V
BCN_S3_FC2V
BCN_SA_Multi_Group
BCN_SA_Multi_Group Multicast Group
CDRs_Multi_Group
CDRs_Multi_Group Multicast Group
CL5_BCN_FCDR_Fires_PLT
CL6_BCN_FCDR_CoHQ_CDR
[illegible]_SA_Multi_Group
[illegible]_HQ_FC2V
[illegible]_HQ_FCDR
[illegible]ffects_FC2V_Fires_FCDR_N_S
[illegible]ffects_Fires_CoHQ_FDC
[illegible]s_Fires_FC2V
FSP_Multi_Group
FSP_Multi_Group Multicast Group
FiresEffects_SA_Multi_Group
FiresEffects_SA_Multi_Group Multicast Group
FiresFC2V_ARES103
FiresGC_LAM_ARES1
FiresSLUG1_ARES1
FiresSLUG1_dismount1
Fires_AN_TPQ47_UGV
Fires_ARES1
Fires_ARES_Multi_Group

Endpoints

Flow Patterns:

BAAV_C2_IER
BAAV_C2_IER2
C2_Launch_IER
C2_RSTA_Data_IER
Command_Launch_IER
Deploy_Plan_IER
EnemyAlert_IER
FSP_Creation_IER
FSP_Creation_IER [106]
FS_BCN_Data_IER
[illegible]ects_Data_IER
[illegible]w_1_ierb
[illegible]w_1_ierj
[illegible]w_2_ierb
[illegible]w_2_ierf
[illegible]w_2_ierg
Flow_2_ierf
Flow_2_ierg
Flow_2_ierh
Flow_3_ier
Flow_3_iera
Flow_3_ierb
Flow_4_ier
Flow_4_ierb
Flow_4_ierc
Flow_4_ierd
Flow_4_iere

Patterns

Scenarios: 0

Source	Source Port	Destination	Destination Port	Multicast Destination	Pattern	Start Time	Stop Time	Scale
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	WARNO_Creation_IER	2410	3010	1
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	WARNO_Update_IER	3010	4210	1
BCN_BN_CMD_FSO_FC...	0	PL_Multi_Group Multicas...	0	PL_Multi_Group	OPORD_IER	2410	4210	1
BCN_BN_CMD_FSO_FC...	0	Fires_FDC_01_Fired_F...	0	N/A	FSP_Creation_IER	4210	6010	1
BCN_BN_CMD_FSO_FC...	0	RoE_Multi_Group Multic...	0	RoE_Multi_Group	RoE_Creation_IER	4210	6010	1
BCN_BN_CMD_FSO_FC...	0	CL5_BCN_FCDR_Fires...	0	N/A	OPORD_IER2	4210	4220	1
BCN_BN_CMD_FSO_FC...	0	CL6_BCN_FCDR_CoH...	0	N/A	OPORD_IER3	4210	4220	1
BCN_BN_CMD_FSO_FC...	0	RoE_Multi_Group Multic...	0	RoE_Multi_Group	Deploy_Plan_IER	6000	6600	1
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	Maneuver_Creation_IER	6000	7800	1
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	WARNO_Update_IER [9]	6100	6106	1
BCN_BN_CMD_FSO_FC...	0	BCN_SA_Multi_Group M...	0	BCN_SA_Multi_Group	SA_BCN_ier	2410	7800	1
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	Voice_IER2	2430	2610	1
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	Voice_IER2	4210	4390	1
BCN_BN_CMD_FSO_FC...	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	Voice_IER2	6200	6380	1
BCN_BN_CMD_FSO_FC...	0	Flow_1_Multi_Group_B ...	0	Flow_1_Multi_Group_B	Flow_1_ierb	0	2400	1
BCN_BN_CMD_FSO_FC...	0	Flow_4C	0	N/A	Flow_4_ierc	6780	7080	1
BCN_S3_FC2V	0	Fires_FDC_01_Fired_F...	0	N/A	FSP_Creation_IER	4210	6010	1
BCN_S3_FC2V	0	BCN_S3_02_Effects_Fir...	0	N/A	FS_Effects_Data_IER	6000	7800	1
BCN_S3_FC2V	0	BCN_SA_Multi_Group M...	0	BCN_SA_Multi_Group	SA_BCN_ier	2410	7800	1
BCN_S3_FC2V	0	Flow_2H	0	N/A	Flow_2_ierh	0	2400	1
BCN_S3_FC2V	0	Flow_5H	0	N/A	Flow_5_ierh	6780	7080	1
Co_HQ_FCDR1	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	WARNO_Creation_IER	2410	3010	1
Co_HQ_FCDR1	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	WARNO_Update_IER	3010	4210	1
Co_HQ_FCDR1	0	PL_Multi_Group Multicas...	0	PL_Multi_Group	OPORD_IER	2410	4210	1
Co_HQ_FCDR1	0	RoE_Multi_Group Multic...	0	RoE_Multi_Group	RoE_Creation_IER	4210	6010	1
Co_HQ_FCDR1	0	RSTA_Collab_Multi_Gro...	0	RSTA_Collab_Multi_Gro...	RSTA_Col_IER	2420	7800	1
Co_HQ_FCDR1	0	PL_Multi_Group Multicas...	0	PL_Multi_Group	OPORD_IER [26]	4220	4230	1
Co_HQ_FCDR1	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	Maneuver_Creation_IER	6000	7800	1
Co_HQ_FCDR1	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	WARNO_Update_IER [28]	6100	6106	1
Co_HQ_FCDR1	0	PL_Multi_Group Multicas...	0	PL_Multi_Group	OPORD_IER [29]	6100	6106	1
Co_HQ_FCDR1	0	CDRs_Multi_Group Multi...	0	CDRs_Multi_Group	SA_CDRs_ier	2410	7800	1

Flows

JMap

- GIS application for displaying the received MGEN data
- Developed by Kenneth Flynn
- Configurable and extendable

JMap

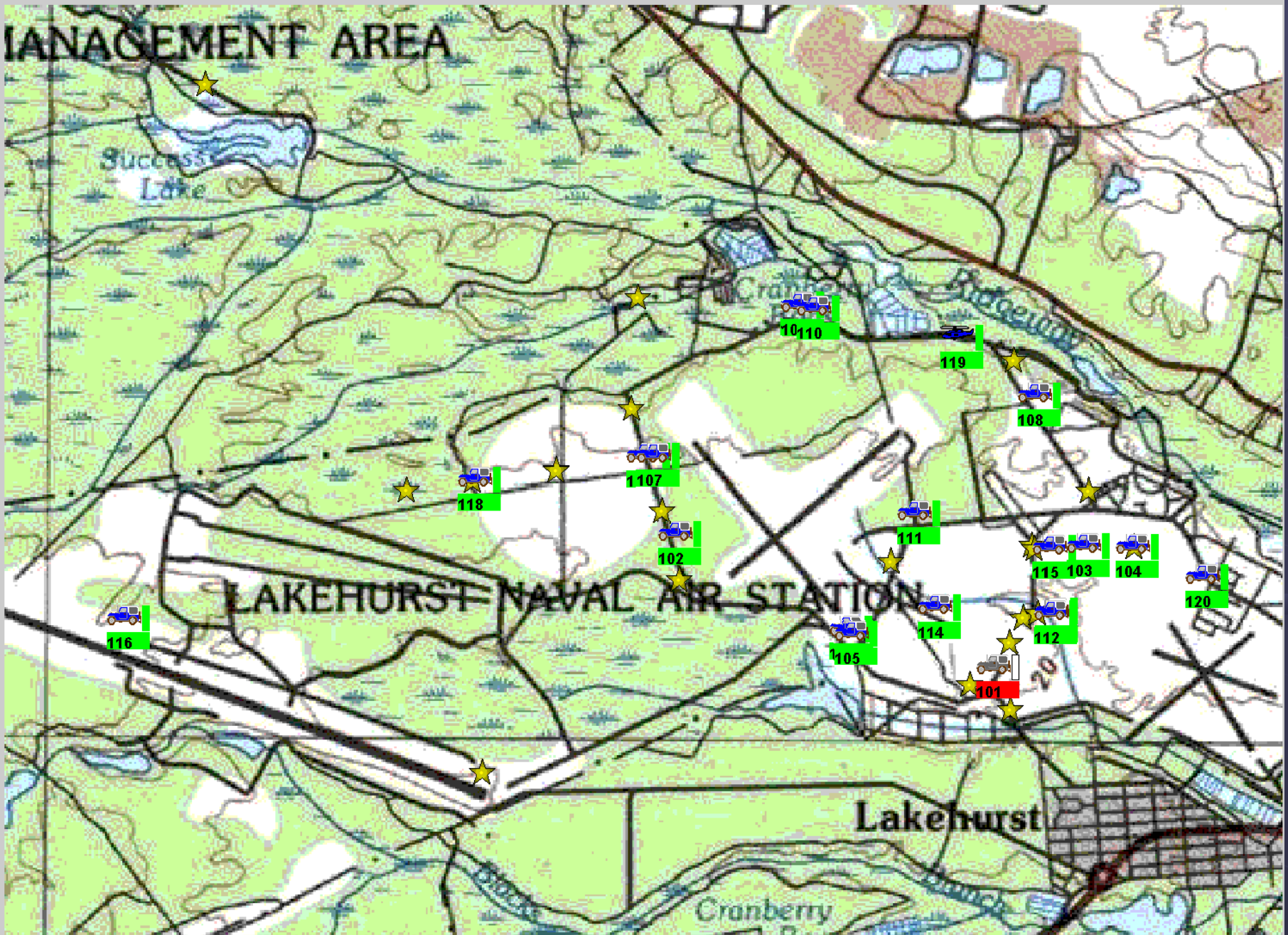
File Map View Playback

Image File: lakehurst-big.jpg

Upper Left (lat, long): 40.1063, -74.4947

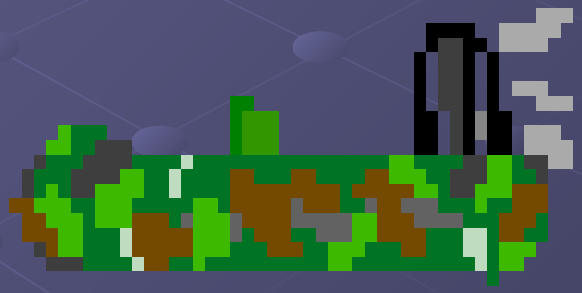
Lower Right (lat, long): 39.9786, -74.2575

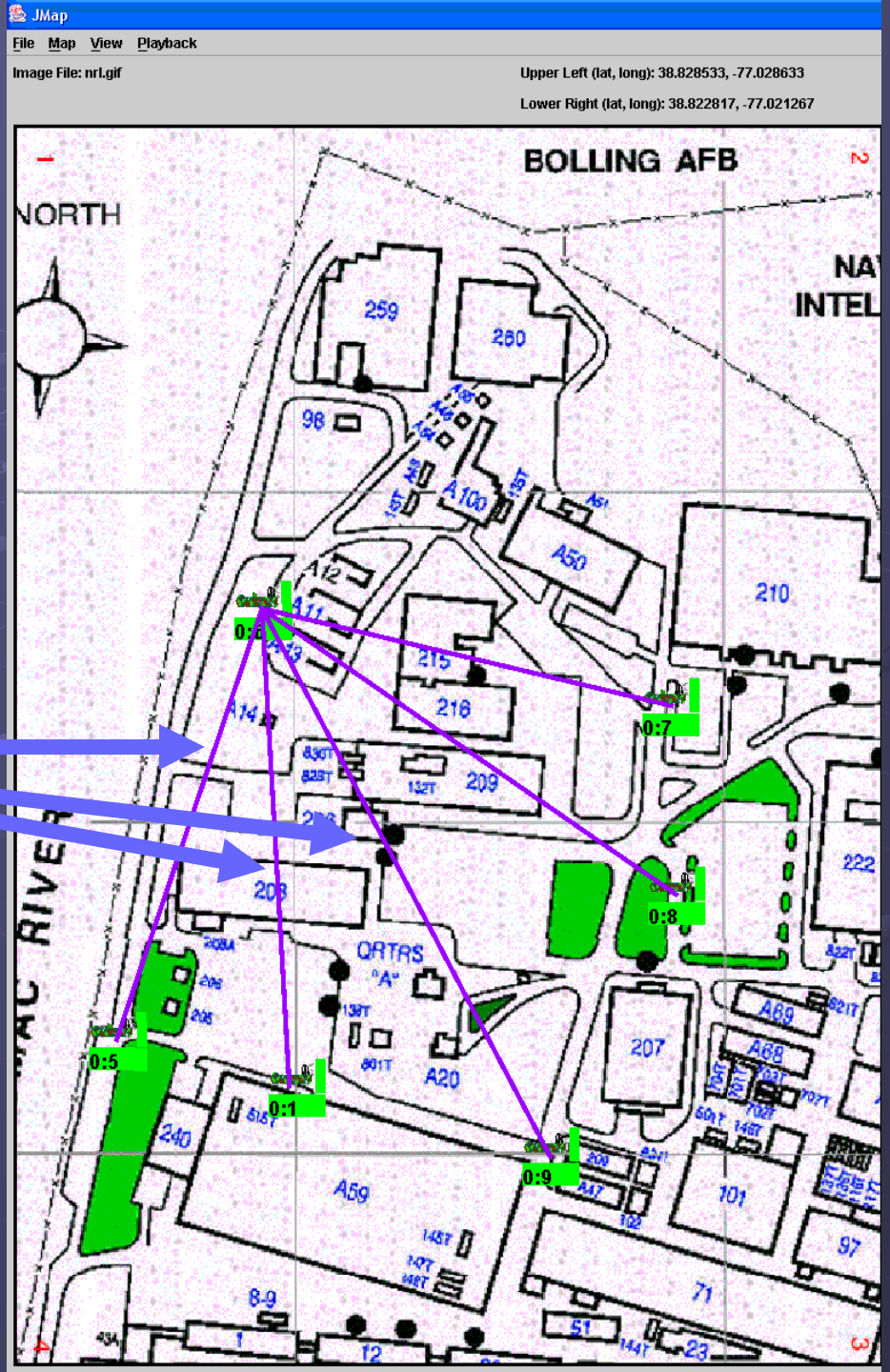
13:12:06



JMap

Links




JMap
File Map View Playback
Image File: nrl.gif
Upper Left (lat, long): 38.828533, -77.028633
Lower Right (lat, long): 38.822817, -77.021267
BOLLING AFB
NORTH
259
260
98
A100
A50
210
215
216
209
208
222
QRTRS
"A"
207
A20
A69
240
A59
101
97
71
8-9
0:1
0:5
0:7
0:8
0:9

Dazle

- Data Analysis
- Developed by John Schlorff
- Crunches the numbers
- Generates HTML pages with results
  - Easily browsed
  - Typically burnt to a CD for archiving and distribution

Dazle - Microsoft Internet Explorer

File Edit View Favorites Tools Help

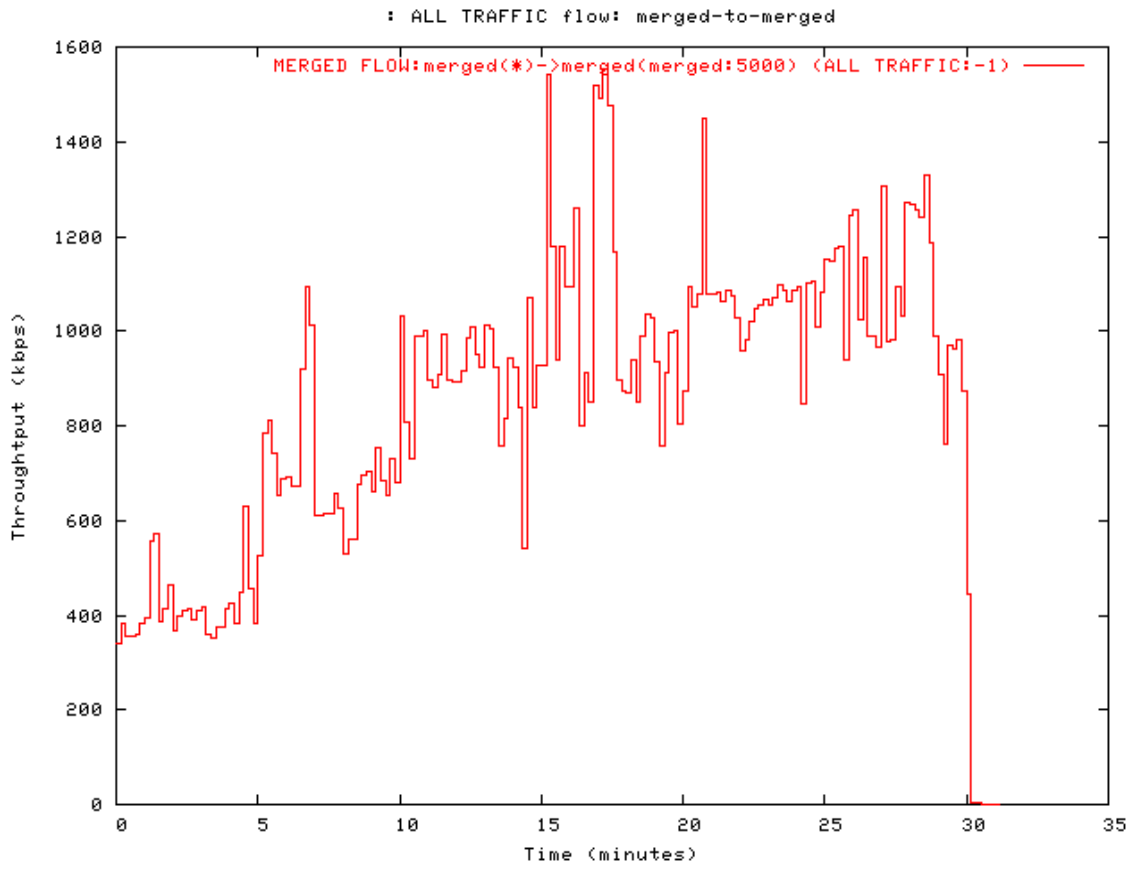
Back Search Favorites Media

Address C:\results\index.html Go Norton AntiVirus

start_to_finish

IN_OUT_flows

- Node_01_out
- Node_01_in
- Node_02_out
- Node_02_in
- Node_03_out
- Node_03_in
- XCom_out
- XCom_in
- ALL_TRAFFIC



Windowing scheme:	start_to_finish
Flowgroup scheme:	IN_OUT_flows
Flowgroup label:	ALL_TRAFFIC
Flow name:	IN_OUT_flows-ALL_TRAFFIC-merged
Print format:	thrpt_rate

plot table

thrpt_rate

auto_resize

Flowgroup: ALL_TRAFFIC

- merged
- Node_01-Node_02 (18)
- Node_01-Node_02 (2)
- Node_01-Node_02 (34)
- Node_01-Node_02 (50)
- Node_01-Node_02 (66)
- Node_01-Node_02 (82)
- Node_01-Node_03 (19)
- Node_01-Node_03 (3)
- Node_01-Node_03 (35)
- Node_01-Node_03 (51)
- Node_01-Node_03 (67)
- Node_01-Node_03 (83)
- Node_01-XCom (20)
- Node_01-XCom (36)
- Node_01-XCom (4)
- Node_01-XCom (52)
- Node_01-XCom (68)

DAZLE

file:///C:/results/start_to_finish/html/ My Computer

The Glue

- Simple Control GUI
  - Easy to use controls for non-engineers
  - Eases staffing issues for large scale tests
  - Allows experts to concentrate on understanding the results
- Configuration Tool
  - Configure all nodes in one place
  - “Push” configuration to nodes

The Glue II

- OS Installation Support
  - RedHat Kickstart scripts
- Deployment
  - Installs all software over the network
  - Hook all the machines to a hub
  - Push “Install Software”
  - Get a cup of java

The Glue III

- Compact Flash Integration
  - Scripts and some configuration sent to node via Compact Flash cards
  - All data collected via the CF cards
  - Similar to USB memory sticks, but larger storage
  - Durable

Control GUI Screenshot

How is Nettion Used?

- Deployment
  - Install OS, Configure an install Nettion
- XCom
  - Run the test
- Nodes
  - Be the test
- Analysis
  - Harvest & analyze data to HTML

Running a Test

- Before the test
  - (Analysis) Push scripts to CF
- At the start of the test
  - (Node) Carry CF to each node, install
  - (XCom) Run “ready” test to verify all systems go
- Run the scenario

Running a Test II

- At the end of the test (or the day)
  - (Node) Collect the CF cards back
  - (Analysis) Grab the data off them (“Harvest Data”)
  - Run analysis tools (“Run Dazle”)
- No need to hook all the nodes together or dismantle the setups

Conclusions

- Nettion was developed with a lot of user input from experienced network testers
  - Support Go/No-Go metrics very well
- Nettion
  - Allows the creation of complex network traffic scenarios
  - Executes those scenarios with large number of mobile nodes
  - Collects and analyzes the large amounts of data

Questions?